IN THE CLAIMS

1. (Currently amended) A method for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads, wherein the first circuit comprises one of a Synchronous Optical Network (SONET) link and a Synchronous Digital Hierarchy (SDH) link, and wherein the sections comprise virtual tributaries of the frames received on the link;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections.

2. (Original) A method according to claim 1, and comprising:

receiving the packets over the packet network;

extracting the user data from the packets; and

generating an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence.

3. (Original) A method according to claim 2, wherein generating the output sequence comprises providing a circuit emulation service over the packet network, whereby the user data are transmitted between the first and second circuits in a manner transparent to a sender and a recipient of the data.

4. (Currently amended) A method ~~according to claim 2~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive;

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections;

receiving the packets over the packet network;

extracting the user data from the packets; and

generating an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein the inactive sections comprise default data, and wherein generating the output sequence of the frames comprises inserting the default data in the sections of the frames in the output sequence that are not selected, whereby the sections that are not selected correspond in form to unequipped sections.

5. (Original) A method according to claim 2, wherein the selected sections of the frames in the output sequence are substantially the same sections as the active sections of the frames in the input sequence.

6. (Currently amended) A method ~~according to claim 2~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input

sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive;

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections;

receiving the packets over the packet network;

extracting the user data from the packets; and

generating an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein generating the output sequence of the frames comprises assigning at least one of the selected sections of the frames in the output sequence to correspond to at least one of the active sections of the frames in the input sequence, and transferring the user data from the at least one of the active sections to the at least one of the selected sections that corresponds thereto, so as to cross-connect a source link in the first circuit to a recipient link in the second circuit.

7. (Original) A method according to claim 6, wherein receiving the TDM input signal comprises assembling the sections of the frames of the input signal from multiple sources.

8. (Currently amended) A method ~~according to claim 2~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive;

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections;

receiving the packets over the packet network;

extracting the user data from the packets; and

generating an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein encapsulating the user data comprises inserting into the packets an indication of a timing adjustment to be applied to one or more of the active sections, and wherein generating the output sequence of the frames comprises adjusting the user data in at least one of the selected sections responsive to the indication.

9. (Original) A method according to claim 8, wherein adjusting the user data comprises applying different timing adjustments to different ones of the selected sections.

10. (Original) A method according to claim 2, wherein generating the output sequence of the frames comprises sending a plurality of output signals containing the data from different ones of the active sections to different, respective destinations.

11. (Canceled)

12. (Currently amended) A method according to ~~claim 11~~ claim 1, wherein encapsulating the user data comprises inserting in the packets pointer movement indications,

indicating timing difference between the received data in the input signal and a reference timing signal, to be applied in generating an output sequence of the frames of the data for transmission over a second circuit without changing pointers of the virtual tributaries pointers relative to the frames in the output sequence.

13. (Currently amended) A method according to ~~claim 11~~ claim 1, wherein encapsulating the user data comprises inserting in the packets pointer movement indications, indicating timing differences between the received data in the input signal and a reference timing signal, to be applied to virtual path level pointers of the active sections in generating an output sequence of the frames of the data for transmission over a second circuit.

14. (Currently amended) A method according to ~~claim 11~~ claim 1, wherein encapsulating the user data comprises adjusting virtual tributary pointers at the first circuit relative to frame pointers of the input signal and a reference timing signal, and wherein encapsulating the user data comprises generating the packets according to the reference timing signal, thereby obviating further adjustments of the pointers in generating an output sequence of the frames of the data for transmission over a second circuit.

15. (Original) A method according to claim 1, wherein receiving the TDM input signal comprises inserting the data from at least one of a DS1 signal and an E1 signal into one or more of the active sections in the input sequence of the frames.

16. (Currently amended) A method ~~according to claim 15,~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections,

wherein receiving the TDM input signal comprises inserting the data from at least one of a DS1 signal and an E1 signal into one or more of the active sections in the input sequence of the frames, and

wherein encapsulating the user data comprises adjusting virtual tributary pointers at the first circuit relative to a reference timing signal, and wherein encapsulating the user data comprises generating the packets according to the reference timing signal, thereby obviating further adjustments of the pointers in generating an output sequence of the frames of the data for transmission over a second circuit.

17. (Currently amended) A method ~~according to claim 1~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections, wherein the inactive sections comprise default data.

18. (Currently amended) A method ~~according to claim 1~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections, wherein the inactive sections are marked as unequipped sections.

19. (Original) A method according to claim 1, wherein the inactive sections are configured such that the data in the inactive sections is not to be sent over the packet network.

20. (Original) A method according to claim 1, wherein encapsulating the user data comprises adding a label to the packets for transmission over the packet network.

21. (Currently amended) A method ~~according to claim 20~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network,

while omitting from the packets at least some of the data from the inactive sections,

wherein encapsulating the ~~packets~~ user data comprises adding a label to the packets for transmission of ~~sending~~ the packets over the packet network through a Multi-protocol Label-Switched (MPLS) tunnel, and wherein adding the label comprises preparing the label for transmission of the packets using circuit emulation over MPLS.

22. (Currently amended) A method ~~according to claim 20,~~ for data communications, comprising:

receiving a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

determining which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive; and

encapsulating the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections,

wherein encapsulating the user data comprises adding a label to the packets for transmission over the packet network, and

wherein the packet network comprises an Internet Protocol (IP) network, and wherein adding the label comprises preparing the label for transmission of the packets as IP packets using circuit emulation over a Multi-protocol Label-Switched (MPLS) path through the IP network.

23. (Original) A method for applying a circuit emulation service (CES) to a Synchronous Optical Network (SONET) input signal that includes a plurality of input virtual tributaries containing data, the method comprising:

determining which of the input virtual tributaries in the SONET input signal are active, such that the data in the active virtual tributaries comprise user data;

receiving the SONET input signal at a CES transmitter on a first SONET link;

encapsulating the user data in the active virtual tributaries of the SONET input signal into data packets at the CES transmitter, while omitting from the packets at least some of the data from the inactive virtual tributaries;

transmitting the packets over a packet network from the CES transmitter to a CES receiver;

extracting the user data from the packets at the CES receiver; and

generating a SONET output signal comprising output virtual tributaries at the CES receiver by inserting the extracted user data from each of the active virtual tributaries into a corresponding one of the output virtual tributaries.

24. (Original) A method according to claim 23, wherein generating the SONET output signal comprises inserting default data into the output virtual tributaries that do not correspond to the active virtual tributaries of the SONET input signal.

25. (Original) A method according to claim 23, wherein generating the SONET output signal comprises inserting the extracted user data from each of the active virtual tributaries into the same one of the output virtual tributaries.

26. (Original) A method according to claim 23, wherein generating the SONET output signal comprises inserting the extracted user data from at least one of the active virtual tributaries into a different one of the output virtual tributaries, so as to cross-connect the virtual tributaries.

27. (Original) A method according to claim 23, wherein encapsulating the user data comprises inserting SONET pointer adjustment data into the packets, and wherein generating the SONET output signal comprises adjusting the user data in at least one of the output virtual tributaries responsive to the pointer adjustment data.

28. (Original) A method according to claim 27, wherein adjusting the user data comprises applying different pointer adjustments to different ones of the virtual tributaries.

29. (Original) A method according to claim 23, wherein encapsulating the user data comprises adding a label to the packets, and wherein transmitting the packets comprises conveying the packets via a label-switched tunnel through the packet network.

30. (Original) A method according to claim 29, wherein the label-switched tunnel comprises a Multi-protocol Label-Switched (MPLS) tunnel, and wherein adding the label comprises prepending information to the data for transmission of the packets using circuit emulation over MPLS.

31. (Currently amended) Apparatus for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads,

wherein the first circuit comprises one of a Synchronous Optical Network (SONET) link and a Synchronous Digital Hierarchy (SDH) link, and wherein the sections comprise virtual tributaries of the frames received on the link; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that

the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections.

32. (Original) Apparatus according to claim 31, and comprising a data receiver, adapted to receive the packets over the packet network and to extract the user data from the packets so as to generate an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence.

33. (Original) Apparatus according to claim 32, wherein the packet network interface is adapted to generate the packets so as to provide a circuit emulation service over the packet network, whereby the user data are transmitted between the first and second circuits in a manner transparent to a sender and a recipient of the data.

34. (Currently amended) Apparatus ~~according to claim 32~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network,

while omitting from the packets at least some of the data from the inactive sections; and

a data receiver, adapted to receive the packets over the packet network and to extract the user data from the packets so as to generate an output sequence of the frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein the inactive sections comprise default data, and wherein the data receiver is adapted to insert the default data in the sections of the frames in the output sequence that are not selected.

35. (Original) Apparatus according to claim 32, wherein the selected sections of the frames in the output sequence are substantially the same sections as the active sections of the frames in the input sequence.

36. (Currently amended) Apparatus ~~according to claim 32~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections; and

a data receiver, adapted to receive the packets over the packet network and to extract the user data from the packets so as to generate an output sequence of the

frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein the data receiver is adapted to receive an assignment of at least one of the selected sections of the frames in the output sequence to correspond to at least one of the active sections of the frames in the input sequence, and to transfer the user data from the at least one of the active sections to the at least one of the selected sections that corresponds thereto, so as to cross-connect a source link in the first circuit to a recipient link in the second circuit.

37. Apparatus according to claim 36, wherein the data receiver is adapted to assemble the sections of the frames of the TDM input signal from multiple signal sources.

38. (Currently amended) Apparatus ~~according to claim 32~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads;

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections; and

a data receiver, adapted to receive the packets over the packet network and to extract the user data from the packets so as to generate an output sequence of the

frames of the data for transmission in a TDM output signal over a second circuit, by inserting the extracted user data in selected sections among the sections of the frames in the output sequence,

wherein encapsulating the packet network interface is adapted to insert into the packets an indication of a timing adjustment to be applied to one or more of the active sections, and wherein the data receiver is adapted to adjust the user data in at least one of the selected sections of the TDM output signal responsive to the indication.

39. (Original) Apparatus according to claim 38, wherein the data receiver is adapted to apply different timing adjustments to different ones of the selected sections.

40. (Original) Apparatus according to claim 32, wherein the data receiver is adapted to send a plurality of output signals containing the data from different ones of the active sections to different, respective destinations.

41. (Canceled)

42. (Currently amended) Apparatus according to ~~claim 41~~ claim 31, wherein the packet network interface is adapted to insert in the packets pointer movement indications, indicating timing difference between the received data in the input signal and a reference timing signal, to be applied in generating an output sequence of the frames of the data for transmission over a second circuit without changing pointers of the virtual tributaries pointers relative to the frames in the output sequence.

43. (Currently amended) Apparatus according to ~~claim 41~~ claim 31, wherein the packet network interface is adapted to insert in the packets pointer movement indications, indicating timing differences between the received data in the input signal and a reference timing signal, to be applied to virtual path level pointers of the active

sections in generating an output sequence of the frames of the data for transmission over a second circuit.

44. (Currently amended) Apparatus according to ~~claim 41~~ claim 31, wherein the packet network interface is adapted to adjust virtual tributary pointers at the first circuit relative to frame pointers of the input signal and a reference timing signal, and to generate the packets according to the reference timing signal, thereby obviating further adjustments of the pointers in generating an output sequence of the frames of the data for transmission over a second circuit.

45. (Original) Apparatus according to claim 31, wherein the circuit interface is adapted to insert the data from at least one of a DS1 signal and an E1 signal into one or more of the active sections in the input sequence of the frames.

46. (Currently amended) Apparatus ~~according to claim 45,~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections,

wherein the circuit interface is adapted to insert the data from at least one of a DS1 signal and an E1

signal into one or more of the active sections in the input sequence of the frames, and

wherein the packet network interface is adapted to adjust virtual tributary pointers at the first circuit relative to a reference timing signal, and to generate the packets according to the reference timing signal, thereby obviating further adjustments of the pointers in generating an output sequence of the frames of the data for transmission over a second circuit.

47. (Currently amended) Apparatus ~~according to claim 31~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections, wherein the inactive sections comprise default data.

48. (Currently amended) Apparatus ~~according to claim 31~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections

comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections, wherein the inactive sections are marked as unequipped sections.

49. (Original) Apparatus according to claim 31, wherein the inactive sections are configured such that the data in the inactive sections is not to be sent over the packet network.

50. (Original) Apparatus according to claim 31, wherein the packet network interface is adapted to add a label to the packets for transmission over the packet network.

51. (Currently amended) Apparatus ~~according to claim 50~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections,

wherein the packet network interface is adapted to add a label to the packets for transmission over the packet network and to send the packets over the packet network through a Multi-protocol Label-Switched (MPLS) tunnel, and wherein the label comprises label data

required for transmission of the packets using circuit emulation over MPLS.

52. (Original) Apparatus ~~according to claim 50,~~ for data communications, comprising:

a circuit interface, coupled to receive a time-division-multiplexed (TDM) input signal on a first circuit, the signal comprising an input sequence of frames of data, each such frame divided into sections for carrying respective sub-rate payloads; and

a packet network interface, adapted to receive an indication of which of the sections are active, such that the data in the sub-rate payloads of the active sections comprise user data, and which of the sections are inactive, and responsive to the indication, to encapsulate the user data in the active sections into data packets for transmission over a packet network, while omitting from the packets at least some of the data from the inactive sections,

wherein the packet network interface is adapted to add a label to the packets for transmission over the packet network, and

wherein the packet network comprises an Internet Protocol (IP) network, and the packet network interface is adapted to prepare the label for transmission of the packets using circuit emulation over a Multi-protocol Label-Switched (MPLS) path through the IP network.

53. (Original) Apparatus for applying a circuit emulation service (CES) to a Synchronous Optical Network (SONET) input signal that includes a plurality of input virtual tributaries containing data, the apparatus comprising:

a transmitter, adapted to receive an indication of which of the input virtual tributaries in the SONET input signal are active, such that the data in the active virtual tributaries comprise user data, and coupled to receive the SONET input signal on a first SONET link, to

encapsulate the user data in the active virtual tributaries of the SONET input signal into data packets at the CES transmitter, while omitting from the packets at least some of the data from the inactive virtual tributaries, and to transmit the packets over a packet network; and

a receiver, coupled to receive the packets over the packet network, and adapted to extract the user data from the packets at the CES receiver and to generate a SONET output signal comprising output virtual tributaries at the CES receiver by inserting the extracted user data from each of the active virtual tributaries into a corresponding one of the output virtual tributaries.

54. (Original) Apparatus according to claim 53, wherein the receiver is adapted to generate the SONET output signal by inserting default data into the output virtual tributaries that do not correspond to the active virtual tributaries of the SONET input signal.

55. (Original) Apparatus according to claim 53, wherein the receiver is adapted to insert the extracted user data from each of the active virtual tributaries into the same one of the output virtual tributaries.

56. (Original) Apparatus according to claim 53, wherein the receiver is adapted to insert the extracted user data from at least one of the active virtual tributaries into a different one of the output virtual tributaries, so as to cross-connect the virtual tributaries.

57. (Original) Apparatus according to claim 53, wherein the transmitter is adapted to insert SONET pointer adjustment data into the packets, and wherein the receiver is adapted to generate the SONET output signal by adjusting the user data in at least one of the output virtual tributaries responsive to the pointer adjustment data.

58. (Original) Apparatus according to claim 57, wherein the receiver is adapted to apply different pointer adjustments to different ones of the virtual tributaries.

59. (Original) Apparatus according to claim 53, wherein the transmitter is adapted to apply a label to the packets so as to convey the packets via a label-switched tunnel through the packet network.

60. (Original) Apparatus according to claim 59, wherein the label-switched tunnel comprises a Multi-protocol Label-Switched (MPLS) tunnel, and wherein the label comprises information prepended to the data for transmission of the packets using circuit emulation over MPLS.